Circular No. 99 June, 1930

MANITOBA DEPARTMENT OF AGRICULTURE AND IMMIGRATION
WINNIPEG, CANADA.

SWEET CLOVER

A Good Type of Sweet Clover

By G. P. McRostie, Ph.D.

Agronomy Department
Manitoba Agricultural College,
Winnipeg, Manitoba.

By Authority of Hon. A. Prefontaine, Minister of Agriculture and Immigration

SWEET CLOVER

Although sweet clover has been grown in Manitoba for a considerable number of years, and in increasing acreages, there still appears to be a rather wide-spread lack of understanding as to its adaptations and uses. This is indicated by the large number and variety of requests for information regarding sweet clover which are received annually by the Agronomy Department of the Manitoba Agricultural College.

In this publication an attempt is made to arrange in a sequence representative questions dealing with the crop from pre-seeding considerations to breaking. Answers are given to the questions raised; and in this way the present status of sweet clover growing, in so far as it concerns the average farmer, is quite thoroughly covered.

QUESTION 1: WHAT IS SWEET CLOVER?

Sweet clover is a legume with a very deep tap root. That is, it possesses a main root with small branches. There are annual and biennial varieties; the former make their entire growth in a single season, while the latter require two years to complete their life cycle. The stems may vary in height from about 2 feet to as high as 6 to 10 feet. As a rule, the stems are coarser and more upright in their habit of growth than those of red clover or alfalfa. Sweet clover has a characteristic odor and a bitter taste, the latter claimed to be due to the presence of a substance called coumarin. The flowers may be yellow or white in color, depending on the species or variety, and are borne in loose, almost spike-like, racemes. The seed is borne within a wrinkled pod, usually one seed being present in a pod.

QUESTION 2: WHAT VARIETIES OR STRAINS ARE AVAILABLE COMMERCIALLY?

The only varieties and strains—seed of which is available commercially in Canada at present—belong to one of three types: Biennial white blossomed; biennial yellow blossomed; and annual white blossomed. Of the biennial white blossomed type, which is by far the most commonly grown, the Common White and the Arctic are the two best known in Manitoba. Of the yellow blossomed types the Common Yellow blossomed and the Yellow I.H.C. are available commercially. The latter type is one developed on one of the trial grounds of the International Harvester Company. In the annual white blossomed class, about the only seed which can be obtained is that of the Hubam, a type developed at the Iowa State Agricultural College. In addition to the foregoing, a number of what appear to be desirable improved strains are being developed at the various agricultural colleges and experiment stations throughout the Prairie Provinces. They are almost entirely of the biennial type, and belong to either the yellow blossomed or white blossomed varieties.

QUESTION 3: WHY GROW SWEET CLOVER?

One of the chief reasons for growing sweet clover is because of the fact that as a legume it has the ability of storing nitrogen. Nitrogen is one of the most

Root Types of Sweet Clover

expensive of fertilizers; and sweet clover presents to the farmer about two-thirds of the nitrogen in the plant. This may amount to one hundred pounds or more per acre, with a good crop.

The second reason why sweet clover should be grown is the fact that it will grow under a great variety of soil and climatic conditions. Most soils of Manitoba which are not subject to periodic flooding, are suitable for the production of sweet clover.

A third reason is that seed of the plant in question is reasonable in price and readily available. This is due to the fact that sweet clover sets seed readily under most conditions.

A fourth reason why sweet clover can be grown to advantage in most localities is that once a stand is secured it provides good pasture and a satisfactory quality of hay or silage. This latter will be referred to later.

The fifth reason for planting sweet clover is that it adds humus to the soil and checks soil drifting. On sandy soils where excessive drifting is liable to occur this occurence will be checked to much better advantage if Western Rye grass is planted in a mixture with the sweet clover.

A sixth reason for growing sweet clover is that the succeeding crop of cereal is increased very appreciably in yield by the residue left from plowing down sweet clover.

A seventh reason why sweet clover may be looked on with favor is that it frequently aids in the production of a satisfactory stand of alfalfa.

QUESTION 4: ON WHAT KIND OF SOIL WILL SWEET CLOVER SUCCEED?

As previously stated, sweet clover will thrive on practically any soil in Manitoba which is free from periodic flooding. It will produce a satisfactory crop in the lighter soil areas of the province where many other types of legumes do not succeed, but of course cannot be expected to give the yields under such conditions that would be produced on the heavier, more fertile soil areas.

QUESTION 5: HOW MUCH SEED IS REQUIRED PER ACRE?

Excellent stands of sweet clover have been secured with as little as 5 pounds of seed per acre. The seeding of such a small amount, however, is not usually desirable. From 10 to 15 pounds per acre is a more average seeding. Some growers even seed as much as 20 or 25 pounds to the acre, claiming to secure a much finer growth thereby. Our experience at the Manitoba Agricultural College has been that 15 pounds per acre is usually quite sufficient to give a satisfactory stand of fine stems. As long as seed is cheap it is desirable to sow around 15 pounds per acre for the sake of securing a fine growth. When the production of a seed crop is desired, instead of a hay crop or soiling crop, it is advisable to cut down the rate of seeding to at least 10 pounds per acre.

QUESTION 6: WHAT IS THE BEST METHOD OF SEEDING?

Seeding may be done with a clover drill or with a grain drill having a grass seed attachment. The seed is also sometimes broadcast by hand or with a Cyclone seeder and harrowed in.

Still other farmers follow the practice of mixing the clover seed with the grain and seeding the two together. While reasonable crops have been secured in seeding sweet clover by any of the foregoing methods, they are not equally satisfactory. Sweet clover seed is small in size, and much of it is lost if it is buried too deeply on the one hand or if not sufficiently covered, on the other. Experiments conducted at the Manitoba Agricultural College, under the soil conditions found in the Red River Valley, indicate that 1 to 1½ inches is the most satisfactory depth to seed. As most growers seed the grain considerably deeper than this, there is a serious objection to including the clover seed along with the cereal, unless the seeder is set to sow both the grain and sweet clover at not over 1½ to 2 inches deep. When circumstances permit, a more satisfactory stand can usually be obtained by seeding the nurse crop first at the usual depth, and then cross seeding the sweet clover with a grass seeder attachment, setting the seeder to plant at not more than 1½ inches in depth. Where a grass seeding attachment is not available, satisfactory seeding can be accomplished by mixing the sweet clover seed with cracked wheat or barley and setting the seeder to sow one half bushel of wheat per acre. The essential point is to get the seed evenly spread and buried to a sufficient depth to come in contact with the soil moisture.

Only clean seed should be used. If this seed is scarified, the percentage of germination will in all probability be considerably increased, particularly with seed of the previous season's crop. Scarifying consists in rubbing the seed coat against some abrasive material until it has become thinner and more easily penetrated by the soil moisture.

QUESTION 7: IS A NURSE CROP DESIRABLE, AND IF SO, WHAT KIND?

The results of experimental work carried on to determine the relative advantages and disadvantages of using a nurse crop in seeding down sweet clover, indicate that under average conditions higher yields may be expected when no nurse crop is used. It has been very seldom, however, that the additional yield secured has been sufficient to make up for the loss of crop incident to seeding without a nurse crop. The usual practice, therefore, is to seed with a nurse crop of oats, wheat, barley or flax. In all cases it has been found desirable to decrease the rate of seeding of the nurse crop to approximately one-half the usual amount used for this purpose.

Because of the fact that barley and flax have a slightly shorter growing season and shade the ground less than wheat or oats, the two crops first mentioned are usually preferred as nurse crops. Barley is used to a considerably greater extent than flax, because of the fact that on the heavier soil types the sweet clover may grow sufficiently rank to interfere with the harvesting of the flax. This does not usually occur in the case of barley.

QUESTION 8: WHAT ABOUT INOCULATING THE SEED BEFORE SOWING?

Where sweet clover has not been grown previously, it is usually found of advantage to inoculate the seed before planting. Inoculation consists in the application of numerous tiny bacteria to the surface of the seed in a liquid form or mixed with the seed in a sand culture. These bacteria thrive on the roots of the sweet clover and enable it to store up nitrogen. Usually the thriftiest sweet clover plants are the ones which have the largest numbers of nodules on the roots. For new plantings it is therefore desirable to use nitroculture. This material can be secured from the Bacteriology Department of the Manitoba Argicultural College at a very reasonable rate. It is also offered for sale by a number of seed firms in the province.

QUESTION 9: HOW SHOULD SWEET CLOVER BE TREATED THE YEAR OF SEEDING?

When sweet clover is seeded with a nurse crop all that needs to be done the year of seeding is to leave the field alone after the nurse crop is removed. The pasturing of areas the year of seeding, particularly if this pasturing is continued at all late in the fall, usually results in severe winter killing. When the sweet clover is seeded without a nurse crop, it is sometimes possible to pasture the crop the first part of August or else clip it quite high, not later than the middle of August. It has been found that the sweet clover comes through the winter better when the growth is somewhat retarted by either pasturing or clipping early in the fall. This is only necessary of course where no nurse crop has been used, and where the seed has been put in sufficiently early to allow the plants to make more growth than is desired for winter protection.

QUESTION 10: AT WHAT STAGE OF GROWTH SHOULD SWEET CLOVER BE HARVESTED?

The stage of growth at which the sweet clover should be harvested will depend on whether the crop is to be used for hay, in the control of weeds, or for seed. When seed is the desired product, it is desirable to allow the plants to mature until

Sweet Clover in Rows Can Be Harvested to Advantage With a Corn Binder

the majority of the seed pods are sufficiently ripe to permit of the seed shelling readily when rubbed between the hands. At this stage approximately two thirds of the pods are brown. Of course it is necessary for the plants to be perfectly dry when this test is made.

When it is desired to cure the sweet clover for hay the most satisfactory stage to cut the plant is just when it is budding to blossom, or when the first few blossoms have appeared. Under conditions where excessive growth has been attained it is sometimes even desirable to cut the plant before this stage. If harvesting is delayed until the plant is in full blossom, or later than this, a much poorer quality of hay is the result.

If a second crop of sweet clover is desired, it will be necessary to cut the first crop sufficiently high to allow for the second growth to develop from the buds left on the lower parts of the branches. A stubble of from 9 to 12 inches is not too long for this purpose.

For fighting weeds, sweet clover may be pastured with cattle or sheep the year after seeding, or it may be cut early for hay before any weeds have gone to seed. If the hay crop can be sacrificed, the sweet clover can be cut quite high early in June and the clippings left on the ground. Under such treatment a heavy second growth is obtained, which growth acts as a smother crop. The second growth can be plowed in July and the land cultivated for the remaining part of the season. The foregoing method of handling sweet clover not only enriches the soil but allows for the destruction of weeds by both smothering and later summer cultivation.

QUESTION 11: WHAT IS THE BEST METHOD OF HANDLING SWEET CLOVER AFTER IT IS CUT?

Once again, the use to which one wishes to put the crop will determine the best method of handling it. When harvesting for seed purposes the crop is usually cut with a grain binder, or in some cases where it has been seeded in rows the corn binder can be used to good advantage for handling the crop. The sheaves are stooked in long stooks and allowed to dry sufficiently to be either stacked or threshed immediately. The ordinary round stook is not satisfactory with sweet clover; molding of the centre sheaves is apt to occur. Threshing should be done in dry weather preceding the freeze-up or else delayed until the hard frosts of the later fall.

For the production of hay, several methods are followed in harvesting the crop. One of the first methods used was to cut with a mower and allow the sweet clover to remain in the swath until the leaves had become partially dry, then rake in a windrow where a further period of drying was allowed, and finally gathering the cut material into small cocks, where it remained until sufficiently dry to remove to the stack or barn. In recent years a good many growers are finding it of decided advantage to harvest with a grain binder and stook in long stooks, allowing the sheaves to remain in the stook until sufficiently dry for storage. The advantage in the latter method lies in the fact that the majority of the leaves are retained. As the leaf of the sweet clover is the portion of the plant richest in protein, any method of harvesting which conserves this valuable food constituent has much to recommend it. Besides conserving the leaf, the handling of the sweet clover in sheaves usually entails less labor than when it is handled by other methods.

A further method of utilization of the sweet clover crop is to conserve it in the form of silage. For this method, the crop is again harvested to best advantage by means of the binder. Sheaves are conveyed immediately to the silo, where they are cut into short lengths and blown into the silo for storage. One of the essentials in the manufacture of a satisfactory sweet clover silage is thorough tramping of the cut material. Where a trench silo is used this can be done by means of horses. With the upright silo, however, man power is usually the only means available for the proper tramping. Practically all of the feeding trouble with sweet clover silage can be traced to mouldy material resulting from the use of too ripe or too dry sweet clover or from insufficient tramping. The need of thorough tramping cannot be too strongly emphasized. When sweet clover is cut at the proper stage, ensiled immediately, and the cut product thoroughly tramped, a good quality of silage almost invariably results.

QUESTION 12: WHEN SHOULD SWEET CLOVER SOD BE BROKEN UP?

One of the reasons why the growing of sweet clover in Manitoba has found favor is because of the fact that it works into the ordinary short rotation practiced on the average farm. In this connection it can be used in place of the full season bare fallow. The seed can be put in with the grain crop, the crop of hay harvested the following year in sufficient time for the land to be immediately plowed and summer fallowed for the remaining portion of the year. When such a practice is followed, sweet clover is usually broken after the first crop is removed. In most cases this appears to be the most profitable way of handling the crop in question. When it is desired to add the maximum amount of humus to the soil, some growers follow the practice of sacrificing the crop of hay and plowing down the sweet clover before it reaches a height sufficient to make the plowing operation difficult. In such cases the sweet clover is simply used as a soiling and weed control crop and appears to be quite satisfactory for this purpose.

For further information regarding Sweet Clover write the Agronomy Department, Manitoba Agricultural College, Winnipeg, Manitoba.